

### REMARKS

Claims 40, 45, 51-52 and 55-56 have been amended to correct typographical errors. No new matter has been added. Claims 1-56 are pending. Claims 1, 14, 23, 30, 38, 43, 48, 49 and 53 are independent.

#### Information Disclosure Statement

The Examiner states at page 2 of the Office Action that reference copies were not received with the Information Disclosure Statement filed August 29, 2001. Copies of the returned post card, the Information Disclosure Statement, Form PTO-1449 and the 75 documents originally submitted and received by the PTO on August 29, 2001 are resubmitted for your consideration (See Appendix A).

#### Rejections under 35 U.S.C. § 112, second paragraph

Claims 40, 45, 51-52 and 55-56 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter applicant regards as the invention. See page 2 of the Office Action. Applicants have amended the claims to provide the proper antecedent basis and believe the claims comply with 35 U.S.C. § 112, second paragraph. Applicants respectfully request reconsideration and withdrawal of this rejection.

#### Obviousness Type Double Patenting Rejections

Claims 1, 4-11 and 14-56 have been rejected under the judicially created doctrine of obviousness type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. 6,322,901 ("the '901 patent") in view of U.S. Patent No. 5,260,957 to Hakimi *et al.* ("Hakimi"). See page 3 of the Office Action. Claims 1, 14, 23, 30, 38, 43, 48, 49, and 53 are independent.

Each of independent claims 1, 14, 23, 30, 38, 43, 48, 49 and 53 includes a **concentrated solid including a plurality of semiconductor nanocrystals**. A concentrated solid is a group of semiconductor nanocrystals on a substrate that is greater than the critical volume fraction required for the development of stimulated emission. See page 9 of the Application. Neither the '901 patent nor Hakimi teach, suggest or motivate one skilled in the art to form a concentrated solid including a plurality of semiconductor nanocrystals. The '901 patent is directed to coating

semiconductor nanocrystals to improve photoluminescent qualities of the crystals. It does not teach or suggest a concentrated solid. Hakimi does not cure this deficiency. Nothing in Hakimi suggests or motivates one skilled in the art to make a concentrated solid including a plurality of semiconductor nanocrystals. In fact, Hakimi does not teach or suggest that there is a critical volume fraction of semiconductor nanocrystals in a concentrated solid required for stimulated emission. As a result, the '901 patent in combination with Hakimi fails to teach, suggest or motivate one skilled in the art to use a concentrated solid.

For at least this reason, independent claims 1, 14, 23, 30, 38, 43, 48, 49 and 53 and the claims that depend from them are patentable over the '901 patent in view of Hakimi. Applicants respectfully request reconsideration and withdrawal of this rejection.

Rejections under 35 U.S.C. § 102(b)

Claims 1, 4-5, 9-12, 14-17, 21-25, 28-34, 37-39, 42-44, 47-50 and 53-54 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Hakimi. See pages 4 and 5 of the Office Action. Claims 1, 14, 23, 30, 38, 43, 48, 49, and 53 are independent.

Applicants have discovered a laser, a gain medium, a method of amplifying an optical signal, and a method of forming a laser that includes a **concentrated solid** including a plurality of semiconductor nanocrystals. See independent claims 1, 14, 23, 30, 38, 43, 48, 49 and 53. The Examiner asserts that "Hakimi discloses a gain medium 12 comprising a concentrated solid including a plurality of semiconductor nanocrystals 14 wherein the solid is [sic] substantially free of defects." See Office Action at page 4. Applicants respectfully disagree. Hakimi discloses "a laser host material such as PMMA or any other suitable low-loss striae free optically clear material." See Hakimi at column 3, lines 32-34. This disclosure does not include a **concentrated solid** with a plurality of semiconductor nanocrystals. As discussed above, a concentrated solid is a group of semiconductor nanocrystals on a substrate that is greater than the critical volume fraction required for the development of stimulated emission. See page 9 of the specification. Hakimi does not describe a concentrated solid in a laser, a gain medium, a method of amplifying an optical signal, or a method of forming a laser.

For at least this reason, claim 1, 14, 23, 30, 38, 43, 48, 49 and 53 and the claims that depend from them are not anticipated by Hakimi. Applicants respectfully request reconsideration and withdrawal of this rejection.

Rejections Under 35 U.S.C. § 103(a)

Claims 2-3, and 13 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Hakimi. See Office Action at page 6. Claims 2-3 and 13 depend from independent claim 1.

As discussed above, Applicants have discovered a gain medium that includes a concentrated solid including a plurality of semiconductor nanocrystals that is substantially free of defects. See independent claim 1. Hakimi does not teach or suggest a concentrated solid including a plurality of semiconductor nanocrystals that is substantially free of defects. As discussed above, a concentrated solid is a group of semiconductor nanocrystals on a substrate that is greater than the critical volume fraction required for the development of stimulated emission. See page 9 of the specification. Nothing in Hakimi suggests or motivates one skilled in the art to use a concentrated solid with a plurality of semiconductor nanocrystals that is substantially free of defects in a gain medium. In fact, Hakimi does not teach or suggest that there is a critical volume fraction of semiconductor nanocrystals required for stimulated emission. As a result, Hakimi fails to teach, suggest or motivate one skilled in the art to use a concentrated solid including a plurality of semiconductor nanocrystals in a gain medium.

For at least this reason, claim 1 and claims 2, 3 and 13 that depend from it are patentable over Hakimi. Applicants respectfully request reconsideration and withdrawal of this rejection.

Attached is a marked-up version of the changes being made by the current amendment.

Applicant : Victor I. Klimov et al.  
Serial No. : 09/805,435  
Filed : March 14, 2001  
Page : 5


Attorney's Docket No.: 01997-297001 / MIT Case 8763

**CONCLUSION**

Applicants ask that all claims be allowed. Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 1-8-03

  
\_\_\_\_\_  
Harold H. Fox  
Reg. No. 41,498

Fish & Richardson P.C.  
1425 K Street, N.W.  
11th Floor  
Washington, DC 20005-3500  
Telephone: (202) 783-5070  
Facsimile: (202) 783-2331

**Version with markings to show changes made**

In the claims:

Claim 40, 45, 51-52 and 55-56 have been amended as follows:

--40. (Amended) The laser of claim 39[38], wherein each first semiconductor material is overcoated with a second semiconductor material.--

--45. (Amended) The laser of claim 44[43], wherein each first semiconductor material is overcoated with a second semiconductor material.--

--51. (Amended) The method of claim 50[49], wherein each first semiconductor material is overcoated with a second semiconductor material.--

--52. (Amended) The method of claim 51[49], wherein each first semiconductor material has a first band gap and each second semiconductor material has a second band gap that is larger than the first band gap.--

--55. (Amended) The method of claim 54[53], wherein each first semiconductor material is overcoated with a second semiconductor material.--

--56. (Amended) The method of claim 55[53], wherein each first semiconductor material has a first band gap and each second semiconductor material has a second band gap that is larger than the first band gap.--



Attorney's Docket No. 01997-297001	Express Mail Label No.	Delivery Date August 29, 2001
Application No. 09/805,435	Filing Date March 14, 2001	Attorney/Secretary Init ELP/HHF/nbc
Title of the Invention OPTICAL AMPLIFIERS AND LASERS		
Applicant Victor I. Klimov et al.		
Enclosures * Information Disclosure Statement (1 page) * Form PTO-1449 (4 pages) * Documents listed on the Form PTO-1449 (75 documents)		

RECEIVED  
JAN 8 2003  
TC 2800 MAIL ROOM  
*For PTO Use Only  
Do Not Mark in This Area*

RECEIVED  
JAN -9 2003  
TC 2800 MAIL ROOM

200